Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of FCC Seeks Comment and Data on Actions to Accelerate Adoption and Accessibility of Broadband-Enabled Health Care Solutions and Advanced Technologies	GN Docket No. 16-46

COMMENTS OF QUALCOMM INCORPORATED

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INTRODUCTION & SUMMARY

Mobile health ("mHealth") technology relies upon mobile broadband connectivity to improve the delivery and quality of healthcare. Qualcomm agrees with the FCC that it is critically important to ensure that all Americans — especially those in unserved and underserved areas of the country — have access to broadband connectivity that is used to support mHealth capabilities. Therefore, we applaud the Commission's actions to promote such access, particularly for mHealth devices, applications, and services, as explained below.[1]

First and foremost, Qualcomm respectfully requests that the FCC make available for commercial use without delay the spectrum bands it has allocated for mobile use. This includes the millimeter wave spectrum the agency authorized for mobile operations in the July 2016 *Spectrum Frontiers Report & Order*.[2] This high-band spectrum will work in tandem with low-band and mid-band spectrum to support 5G-based mHealth applications and services to underserved areas. Commission action to open additional low-, mid-, and high-band spectrum for exclusive, licensed use also is needed to support mHealth needs in the coming years. *Second*, Qualcomm supports the FCC's active efforts through its universal service programs to encourage deployment to unserved and underserved areas. *Third*, we support the agency's actions to streamline approval processes for wireless infrastructure. Modernizing siting approval processes for miniature cell site installations is needed to enable the efficient deployment of infrastructure necessary to support 4G LTE Advanced and soon-to-be deployed 5G networks.

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[1] FCC Public Notice, *FCC Seeks Comment and Data on Actions to Accelerate Adoption and Accessibility of Broadband-Enabled Health Care Solutions and Advanced Technologies*, GN Docket No. 16-46, FCC 17-46 (Apr. 24, 2017).

[2] *Use of Spectrum Bands Above 24 GHz for Mobile Radio Services*, GN Docket No. 14-177, Report and Order and Further Notice of Proposed Rulemaking, 31 FCC Rcd 8014 (2016) (the "*Spectrum Frontiers R&O and FNPRM*").

For many years, Qualcomm has been actively involved with our wireless industry partners in enabling mHealth devices, applications, and services to improve the delivery of healthcare to all Americans. Through these efforts and the launch of our wholly-owned medical device subsidiary, Qualcomm Life, our technologies are supporting wireless health services and projects both globally and across the United States. Today, Qualcomm's wireless chipsets are used in health and fitness products and services that improve the delivery and quality of healthcare. Medical devices, health sensors, and mobile software applications use their integrated wireless functionality to securely communicate diagnostic health information, aspects of care, emergency services, and patient information. From the smartphones that care providers use to communicate with patients and other healthcare professionals, to the field laptops used by emergency management responders to triage patient information and send records, to the tablets and smartphones specialists use to download diagnostic data, medical images, and drug information, ubiquitous 4G LTE wireless networks are at the heart of today's mHealth systems and 5G networks will deliver more robust capabilities as these technologies expand and evolve.

Qualcomm welcomes the Commission's request for input on how to further accelerate adoption of mHealth solutions, particularly since we are in the midst of a revolution in the provision and delivery of care in America — a revolution that collapses time, space, and distance — where wireless broadband technologies allow important patient information to be sent to healthcare professionals, clinicians, and loved ones, improving care and enhancing lives. And, as explained in the Public Notice, mHealth solutions are needed to address America's "health care supply problem" and shortages of physicians that disproportionately impact rural communities.[3] The recommendations included herein directly address this important need.

[3] FCC Public Notice at 4. *See also id.* at 9.

DISCUSSION

I. The FCC Should Continue To Move Rapidly To Enable Access To All Mobile Bands That Can Support m-Health And Other Important Broadband Applications

Qualcomm and its wireless industry partners are working with the new administration, Congress, and federal agencies to speed the arrival of 5G services that will support countless innovative mHealth applications and much more. Federal government efforts to identify, allocate, and authorize spectrum for mobile use — be it licensed, unlicensed, or shared — must continue at an accelerated pace. Access to additional spectrum is key to continuing the cycle of wireless innovation and investment that is enabling ongoing 5G trials and spurring the deployment of mHealth, smart city, and many other life-enhancing IoT devices, applications, and services.

Qualcomm applauds the Commission's timely work to allocate millimeter wave band spectrum for flexible use *Spectrum Frontiers R&O*, and we encourage the agency to rapidly auction the millimeter wave spectrum that is in the agency's inventory, and allocate and auction for licensed terrestrial use the spectrum identified in the *Spectrum Frontiers FNPRM*.[4] Indeed, it is critically important that the FCC continue working with NTIA and Congress to identify additional low- and mid-band spectrum for exclusive, licensed use, including spectrum currently held by federal agencies. Licensed spectrum is the lifeblood of wireless services that need to support a given quality of service, and increasing available licensed spectrum drives greater competition among mobile operators.

According to the 2012 PCAST report on government-held spectrum, approximately two-thirds of the spectrum between 225 MHz and 3.7 GHz is allocated at least in part to federal

[4] *See* Qualcomm Comments and Reply Comments on *Spectrum Frontiers FNPRM*, GN Docket No. 14-177 (filed Sept. 30, 2016 and Oct. 31, 2016).

agencies.[5] Low-band and mid-band spectrum provide the coverage and capacity needed to help facilitate the transition to 5G, so the FCC should evaluate all such spectrum opportunities for licensed or shared use. Currently, the 3.5 GHz band is the only mid-band U.S. spectrum band targeted for 5G use, and the FCC also should ensure that the policies in place for this band reflect a workable three-tier sharing framework that provides the certainty needed for wireless providers to invest and deploy wireless broadband connectivity. And, making additional high-band spectrum available for exclusive, licensed use is critical for wireless providers as they start preparing for 5G services. Thus, the FCC needs to make the additional bands identified in the *Further Notice* available for flexible, licensed use as soon as possible.

II. Qualcomm Supports FCC Efforts To Encourage Deployment To Unserved And Underserved Areas And Streamline Approval Processes For Wireless Infrastructure

Qualcomm applauds the FCC's ongoing efforts through its universal service programs to provide funding for mobile broadband to places in America that lack access.[6] Although mobile service providers continue to invest and deploy to rural areas, comprehensive universal service support remains necessary to meet the shared goal of closing the digital divide in rural areas. The Commission's Rural Health Care program can allow rural healthcare providers to use 5G connectivity to meet their needs, given the massive increases in speed and capacity 5G will provide. The Mobility Fund also can enable wireless service to rural and high-cost areas where consumers lack broadband access. Mobility Fund support can accelerate investment and

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[5] *See* President's Council of Advisors on Science and Technology (PCAST), *Realizing the Full Potential of Government-Held Spectrum to Spur Economic Growth*, at 8 (July 20, 2012), https://obamawhitehouse.archives.gov/sites/default/files/microsites/ostp/pcast_spectrum_report_final_july_20_2012.pdf.

[6] *See, e.g.*, FCC Chairman Ajit Pai, "Bringing The Benefits Of The Digital Age To All Americans" (Mar. 15, 2017) at 5 *available at* https://apps.fcc.gov/edocs_public/attachmatch/DOC-343903A1.pdf.

planning by providing advanced detailed guidance about the reverse auction, deployment, service obligations, compliance processes, and other aspects of Mobility Fund II.

Qualcomm also supports FCC engagement in a comprehensive review of the regulations governing wireless network infrastructure deployment to streamline approvals where possible.[7] Wireless service providers need to install or upgrade a substantial amount of wireless infrastructure to support growing demand for broadband via next-generation technologies. Parties seeking today to deploy a miniaturized small cell often need to secure multiple approvals from different regulators and navigate federal and local processes for environmental and historic preservation review, among other hurdles. These processes need be streamlined given that next generation infrastructure is considerably smaller than conventional cell sites. Since highly densified wireless networks will be supported at least in part by a wireline infrastructure, Qualcomm also supports Commission action to streamline approval of wireline deployments by easing administrative barriers and backing next-generation fiber networks.[8]

Infrastructure siting policies will play a vital role in ensuring 5G success. Reforms that account for the reduced size of 5G equipment and its minimal impact on rights-of-way are needed to realize the benefits of this next generation technology. We welcome the efforts of the recently formed Broadband Deployment Advisory Committee ("BDAC") in this regard.[9] As

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7 *See Accelerating Wireless Broadband Deployment by Removing Barriers to Infrastructure Investment*, Notice Of Proposed Rulemaking and Notice Of Inquiry, WT Docket No. 17-79, FCC 17-38 (Apr. 21, 2017).

8 *See Accelerating Wireline Broadband Deployment by Removing Barriers to Infrastructure Investment*, Notice Of Proposed Rulemaking, Notice Of Inquiry, and Request for Comment, WT Docket No. 17-84, FCC 17-37 (Apr. 21, 2017).

9 The BDAC is expected to formulate a model code for encouraging broadband deployment that addresses issues relating to local franchising, zoning, permitting, and rights-of-way regulations and will be a valuable tool for rural communities that seek to access high-speed broadband but lack the expertise or resources to develop such policies.

Chairman Pai has explained, "[f]uture 5G technologies will require 'densification' of wireless networks. That means providers are going to deploy hundreds of thousands of new antennas and cell sites, and they are going to deploy many more miles of fiber to carry all of this traffic."[10] Thus, Qualcomm strongly supports Commission efforts to identify regulatory barriers to infrastructure investment and make recommendations on reducing or removing them so it can carry out its statutory responsibility to encourage broadband deployment to all Americans.

III. Qualcomm Is Supporting mHealth Projects And Developing Technologies To Improve The Delivery And Quality Of Healthcare Services To All Americans

Qualcomm is a major global supplier of wireless chips, and a leading inventor of wireless technologies. We are a world leader in 3G, 4G and 5G wireless technologies as well as Wi-Fi, Bluetooth, and other unlicensed technologies. Our innovative technologies enable the use of mobile broadband connectivity for chronic disease management, remote patient monitoring, diagnostic care, as well as products associated with general health, wellness, fitness, and aging.

Qualcomm partners with foundations, health institutions, medical device manufacturers, health alliances, firms, and associations involved in numerous facets of the healthcare ecosystem, so they can leverage wireless technologies and mobile broadband to improve healthcare and maximize the potential of healthcare delivery through these technologies. Qualcomm and our partners are working to effectuate dramatic improvements in the quality of healthcare while reducing costs and eliminating inefficiencies in the healthcare system.

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[10] Remarks of FCC Commissioner Ajit Pai, Remarks at the Brandery: A Digital Empowerment Agenda Cincinnati, OH, at 2 (Sept. 13, 2016) *available at* https://apps.fcc.gov/edocs_public/attachmatch/DOC-341210A1.pdf. *See also* Statement of FCC Commissioner Mignon Clyburn, Senate Committee on Commerce, Science, and Transportation, Oversight of the Federal Communications Commission (Mar. 8, 2017) *available at* http://transition.fcc.gov/Daily_Releases/Daily_Business/2017/db0308/DOC-343813A1.pdf ("[T]o reap the benefits of 5G services, … we need to not only have adequate spectrum, but the necessary infrastructure … to deploy that spectrum.").

Qualcomm Life ("QCL"), a wholly-owned subsidiary of Qualcomm Incorporated, is a medical device manufacturer focused on device connectivity and data management. QCL also is empowering other medical device manufacturers to deliver wireless healthcare solutions to improve patient care. QCL developed the 2net™ Hub and 2net Platform. The 2net Hub, a compact "plug-and-play" mobile broadband gateway that supports Bluetooth, Bluetooth Low Energy, Wi-Fi, and ANT+ local area radio protocols, connects medical devices to the 2net Platform's data center. The 2net Platform reliably and securely collects and delivers medical device data to integrated portals or databases. QCL's 2net™ and Capsule Platforms capture, connect, integrate, and analyze data into hospital electronic health record systems and other enterprise systems to enable rapid and secure data management and enhance clinical workflows, improve operational efficiencies, and enable informed interventions across the care continuum.

QCL's medical-grade platforms and expansive open ecosystem enable leading health care companies to scale their solutions and realize the benefits of secure, near real-time patient and consumer data. Our heritage in mobile helps these companies set their roadmaps and envision new connected health opportunities for next-generation products and therapies.

Qualcomm's Wireless Reach initiative is a global strategic program that brings wireless technology to underserved communities to demonstrate innovative uses of mobile technologies for social good and help drive human and economic progress in underserved areas.[11] Wireless Reach invests in projects that enhance the delivery of healthcare, aid in public safety, enrich teaching and learning, foster entrepreneurship, and improve environmental sustainability. There are more than one hundred Wireless Reach projects in various stages of development in dozens

[11] *See* Qualcomm Wireless Reach website *available at* https://www.qualcomm.com/company/wireless-reach.

of countries — a number of which are focused on healthcare. A project in Flagstaff, Arizona, for example, is showed how an mHealth solution can dramatically decrease healthcare costs and improve patient outcomes. The Flagstaff Medical Center gave patients with chronic heart failure mobile broadband-enabled remote monitoring kits so their care providers could better manage their disease to hopefully reduce their hospital readmittance rate.[12]

Researchers associated with this project found that compared to the six months prior to enrollment, patients using remote monitoring had 44% fewer hospitalizations and spent 64% fewer days hospitalized in the six months following enrollment. As a result, hospital charges per patient were on average $92,000 less in the six months following enrollment. This project is currently scaling across the entire Northern Arizona Healthcare System as the standard of care, and will be used for all patients with chronic heart failure, respiratory disease and sepsis. Qualcomm is very excited by the outstanding results that remote monitoring provides, and we will continue working to create blueprints for scale for mHealth programs.

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[12] *See* Qualcomm Press Release, "Qualcomm and Northern Arizona Healthcare Expand Home Health Monitoring Program to Enhance the Care of Cardiac, Pulmonary and Post-operative Patients," (Aug. 31, 2015) *available at* http://www.qualcommlife.com/press-releases/item/august-31-2015-qualcomm-and-northern-arizona-healthcare-expand-home-health-monitoring-program-to-enhance-the-care-of-cardiac-pulmonary-and-post-operative-patients. *See also* W. T. Riley, *et al.* Program Evaluation of Remote Heart Failure Monitoring: Healthcare Utilization Analysis in a Rural Regional Medical Center. *Telemedicine Journal and E-Health*, 21(3) (2015), 157–162 *available at* http://doi.org/10.1089/tmj.2014.0093.

CONCLUSION

Qualcomm is excited by the FCC's efforts to accelerate the adoption and availability of mHealth and Health IT services and applications, and we encourage the FCC to take the actions detailed herein. As noted above, smartphones, tablets, and other personal wireless devices are integral to the lives of tens of millions of American consumers who use broadband access to communicate with healthcare professionals and family, as well as store and retrieve from the cloud patient medical data and healthcare information. Wireless technology is enabling health and life sciences products and converged medical devices that advance the critically important work carried out by America's doctors, nurses, clinicians, emergency medical technicians, and public safety personnel. We welcome the FCC's involvement in this space given our own active engagement in research and technology development efforts related to mobile health and wireless life sciences.

Respectfully submitted,

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